

**Skills Worksheet**

# **Directed Reading**

## **Section: Passive Transport**

**Read each question, and write your answer in the space provided.**

- 1.** What is passive transport? Why is diffusion an example of passive transport?

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- 2.** How does the cell membrane help cells maintain homeostasis?

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- 3.** What determines the direction in which a substance diffuses across a membrane?

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- 4.** Describe the state of equilibrium.

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**In the space provided, explain how the terms in each pair differ in meaning.**

- 5.** osmosis, diffusion

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**Directed Reading *continued***

**6. hypertonic solution, hypotonic solution**

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**7. isotonic solution, equilibrium**

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**In the space provided, write the letter of the description that best matches the term or phrase.**

\_\_\_\_\_ **8. hypertonic solution**

\_\_\_\_\_ **9. selective permeability**

\_\_\_\_\_ **10. osmosis**

\_\_\_\_\_ **11. negatively charged**

\_\_\_\_\_ **12. facilitated diffusion**

\_\_\_\_\_ **13. concentration gradient**

\_\_\_\_\_ **14. ion channel**

**a.** difference in the concentration of a substance across a space

**b.** the inside of a typical cell

**c.** diffusion of water through a cell membrane

**d.** allows charged molecules to pass through the cell membrane

**e.** enables a cell to control what enters and leaves

**f.** will cause a cell to shrivel up

**g.** involves carrier proteins

**Skills Worksheet**

# **Directed Reading**

## **Section: Active Transport**

**Complete each statement by writing the correct term or phrase in the space provided.**

1. The transport of a substance across the cell membrane against its concentration gradient is called \_\_\_\_\_.
2. Active transport requires the cell to use \_\_\_\_\_.
3. The energy needed for active transport is usually supplied by \_\_\_\_\_.
4. The sodium-potassium pump is a(n) \_\_\_\_\_ protein.
5. The concentration of sodium ions inside the cell is usually \_\_\_\_\_ than the concentration of sodium ions outside the cell.
6. The concentration of potassium ions inside the cell is usually \_\_\_\_\_ than the concentration of potassium ions outside the cell.
7. The sodium-potassium pump picks up \_\_\_\_\_ ions outside the cell.
8. The sodium-potassium pump releases \_\_\_\_\_ ions inside the cell.

**Read each question, and write your answer in the space provided.**

9. Explain why proteins and polysaccharides cannot diffuse through the membrane like water does.

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**Directed Reading *continued***

**10.** What is the difference between endocytosis and exocytosis?

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**11.** How is a vesicle formed in endocytosis?

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**12.** What happens to a vesicle in exocytosis?

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**13.** How do sodium-potassium pumps support the efficient functioning of cells?

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**In the space provided, write the letter of the description that best matches the term or phrase.**

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|--|---|
| _____ <b>14.</b> signal molecule         | <b>a.</b> a large protein in the cell membrane that transports a specific ion                               |
| _____ <b>15.</b> receptor protein        | <b>b.</b> acts as a signal molecule in the cytoplasm  |
| _____ <b>16.</b> ion channel             | <b>c.</b> a protein that binds to a specific signal molecule  |
| _____ <b>17.</b> second messenger        | <b>d.</b> speeds up chemical reactions in the cell  |
| _____ <b>18.</b> enzyme action           | <b>e.</b> a drug that interferes with the binding of signal molecules to receptor proteins in heart muscles |
| _____ <b>19.</b> beta blocker            | <b>f.</b> carries information throughout the body and to other cells  |
| _____ <b>20.</b> changes in permeability | <b>g.</b> occur when a receptor protein is coupled with an ion channel                                      |

# Answer Key

## Directed Reading

### SECTION: PASSIVE TRANSPORT

1. Passive transport is movement across a cell membrane that does not require energy from the cell. Osmosis is an example of passive transport because it does not require energy from the cell.
2. Cell membranes control the movement of substances into and out of cells.
3. Substances diffuse across the cell membrane from an area of high concentration to an area of lower concentration.
4. Equilibrium is a condition in which the concentration of a substance is equal throughout a space.
5. Osmosis is the diffusion of water through a selectively permeable membrane. Diffusion is the movement of a substance from an area of high concentration to an area of lower concentration.
6. A hypertonic solution causes a cell to shrink as water moves out of the cell by osmosis. A hypotonic solution causes a cell to swell as water moves into the cell by osmosis.
7. An isotonic solution has no effect on cell volume. In a solution, equilibrium is a state in which there is no net movement of substances. Cells are in a state of equilibrium in an isotonic solution.
8. f
9. e
10. c
11. b
12. g
13. a
14. d

### SECTION: ACTIVE TRANSPORT

1. active transport
2. energy
3. ATP
4. carrier
5. less

6. greater
7. potassium
8. potassium
9. Proteins and polysaccharides are too large.
10. Endocytosis involves the movement of substances into cells. Exocytosis involves the movement of substances out of cells.
11. In endocytosis, a cell membrane forms a pouch around a substance. The pouch closes up and pinches off from the membrane, enclosing the substance in a vesicle inside the cell.
12. In exocytosis, a vesicle fuses with the inner surface of a cell membrane. The outer surface of the membrane opens, releasing the contents of the vesicle outside the cell.
13. They keep the sodium content of the cell at a low level. Too much sodium in a cell would cause water to enter the cell by osmosis, causing the cell to swell or burst. They also maintain the concentration gradients of sodium and potassium ions, which cells use to transport substances such as glucose across cell membranes.
14. f
15. c
16. a
17. b
18. d
19. e
20. g

## Active Reading

### SECTION: PASSIVE TRANSPORT

1. osmosis; the diffusion of water through a selectively permeable membrane
2. Osmosis is a type of diffusion.
3. Other forms of diffusion involve movement of different substances down a concentration gradient.
4. d